

Work Order ID 62045

Wednesday, September 15, 2010 11:11:56 A



Page 1

Item ID: D212-664-107

Accept



Setup Start



Revision ID:

Item Name: Crosstube Low Standard Fwd

Stop



Start Date: 9/15/2010 Start Qty: 1.00



Cust Item ID:

Required Date: 9/22/2010 Req'd Qty: 1.00



Customer:

Reference:

Approvals:

Process Plan:

[Signature]

Date: 10-9-15

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Run Start



Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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Draw Nbr	Revision Nbr
D212-664-147	Rev B

100

0.00



DOCUMENT CONTROL

DC

Memo

0.00

Document Control

Photocopy bluefile and create labels as per PPP D212-664-107 CHG001

Solidos

[Signature] BG 10-10-04

110

0.00



Packaging

Packaging

Memo

0.00

Packaging

(IX) MB 10-09-21

120

0.00



BENDING MACHINE - CROSSTUBES

CNC Bend 2

Memo

0.00

CNC Alpha 160 Bender

Bend tube as per Dwg D212-664-107 using CNC bender program 212-107

(IX) MB 10-09-21

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

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Item ID: D212-664-107

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Customer:

Reference:

Run Start



Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Stop



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
130	QC15- Crosstube Dimensional Check	0.00							
QC	Memo	0.00				②			
Quality Control									
140	Crosstubes	0.00							
Crosstubes	Memo	0.00				①			
Crosstubes	1-Cut tube as per inspection dwg and deburr ends. ***ensure saw is square***								
	2-Position cuffs on tube ensure proper positioning								
	3-Drill tube as per dwg using DT8577 location #7 & # 212 ULF using jig DT8548 and DT8549 as per QSI 10								
	4-Transfer drill rivet holes from cuff into tube.								
	5-Identify cuff position and Batch # on each.								
	6- Inspect surface damage								
	7- Deburr and realodine cuff.								

Siolorlzz

SAD
10-07-23

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

150

Crosstubes Chemical Conversion

0.00



HandFXtube

Memo

0.00

SAD 10-09-23



Hand Finishing Crosstubes

160

QC3- Inspect Part Finish

0.00



QC

Memo

0.00

8/10/09/07

Quality Control

170

QC5- Inspect part completeness to step on W/O

0.00



QC

Memo

0.00

8/10/09/07

Quality Control



W/O:		WORK ORDER CHANGES					
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Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start

Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
180  Outsource2 Outsource process - NDT	Outsource process - NDT per QSI038 4.1 Memo Liquid Penetrant Inspection as per QSI 038Or Issue P/O: <u>12053</u> LPI as per ASTM 1417 Level 2 Attach copy of NDT results to work order	0.00 0.00							<u>02</u> <u>10/9/28</u> <u>(1)</u>
190  Packaging Packaging	Packaging Memo Ensure copy of NDT results attached to work order.	0.00 0.00							<u>P</u> <u>10/9/29</u> <u>(1)</u>
200  QC Quality Control	QC5- Inspect part completeness to step on W/O Memo Inspect for damage & ensure results are as per Dwg D212-664-107	0.00 0.00							<u>m</u> <u>10</u> <u>09</u> <u>28</u> <u>(1)</u>

W/O:		WORK ORDER CHANGES					
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Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Stop



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
210		0.00							
	Crosstubes					<u>M</u>	<u>10</u>	<u>09</u>	<u>29</u> (1)
Crosstubes	Memo	0.00							
Crosstubes	1-Rivet Cuffs as per Dwg D212-664-147. with Sika flex in Between tube & Cuff A/R SIKAFLEX -241/-291 BATCH: <u>115114 exp. 01/2011</u>								
220		0.00							
	SprayPaint								
SprayPaint	Memo	0.00							
Spray Painting	1-Prime inside and outside crosstube as per QSI 005 4.2 2-Paint outside crosstube with White Imron as per QSI 005 4.2 PRIME: Start Time: <u>10:30</u> Fininsh Time: <u>11:30</u> PAINT: Start Time: <u>3:30</u> Finish Time: <u>4:30</u>								
						<u>29</u>	<u>10-09-29</u>		(x1)

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Reference:

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Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Stop



QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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230

QC14- Inspect Spray Paint

0.00



QC

Memo

0.00

Quality Control

Wrap in plastic bag to protect from scratches

ml 10 09 30 (1)

240

Crosstubes

0.00



Crosstubes

Memo

0.00

Crosstubes

1- Assemble as per Dwg D212-664-147

2- Lightly scuff the bonded area using a 320 grit sand paper and clean the area with 41058 wash 'n' wipe

3- Instal support with magnobond 6398 per dwg D212-664-147, cure for 12hrs before packaging.

Time & date of application: 10:00

Batch: 114158

EXP. DATE 01/2011

Touque: ml 10/10/04

ml 10 10 01 (1)

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Abstract

Wednesday, September 15, 2010 11:11:56 A

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Setup Start



Stop

00000000000000000000

[illegible]

Start Date: 9/15/2010 **Start Qty:** 1.00

Cust Item ID:

Required Date: 9/22/2010 **Req'd Qty:** 1.00

Abstract

Customer:

Reference:

Run Start

Abstract

Approvals: **Process Plan:** _____ **Date:** _____ **Tooling:** _____ **Date:** _____

Stop

Abstract

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Date: _____ **SPC (Y/N):** _____

Date:

**Insp.
Stamp**

0.00

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QC

Memo

0.00

Σ 10/10/04

④

Quality Control

0.00



Packaging

Memo

0.00

Page 1

Packaging

0.00

[illegible]

QC

Memo

0.00

Scholar

④

Quality Control

W/O:		WORK ORDER CHANGES					
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NOTE: Date & initial all entries

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Item ID: D212-664-107

Accept



Setup Start



Revision ID:

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Stop



Start Date: 9/15/2010 Start Qty: 1.00



Cust Item ID:

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Run Start



Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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270

0.00



Packaging

Packaging

Memo

0.00

Packaging

Identify and pack for shipping as per PPP D212-664-107 *AKA*

09/15/10

280

0.00



QC21- Final Inspection - Work Order Release

QC

Memo

0.00

Quality Control

10/10/10

u 10/10/10

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NOTE: Date & initial all entries

Picklist Print

Wednesday, September 15, 2010 11:11:59 AM

Page 1

Work Order ID: 62045

Parent Item: D212-664-107

Parent Item Name: Crosstube Low Standard Fwd

Start Date: 9/15/2010


Required Date: 9/22/2010

Start Qty: 1.00

Required Qty: 1.00


Comments: IPP Rev:A New Issue 07.09.12 EC verified by: JLM
 IPP Rev:B ECN 1100 08-01-11 DD verified by: EC
 IPP Rev:C Ecn 1121 08-02-25 DD Verified by:ec IPP Rev:D
 10.05.27 added pick kit DD verf:EC

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
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D212-664-107TRN		Manufactured	No			140	Each	3.0000	1	1			
													
Crosstube Turning Detail													


Location	Loc Qty	Loc Code
LG	3	
50698	1	
58588	1	
58611	1	

1X

D3659-1		Manufactured	No			220	Each	5.0000	2	2			
													
CUFF													

Location	Loc Qty	Loc Code
ST477	5	
50691	5	

2

CR3212-4-06		Purchased	No			240	Each	1,309.000	44	44			
													
CHERRY RIVET													

Location	Loc Qty	Loc Code
ST311	1309	
112492	156	
112612	153	
112724	200	
112794	800	

ml 10.09.29

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Picklist Print

Wednesday, September 15, 2010 11:11:59 AM

Page 2

Work Order ID: 62045

Parent Item: D212-664-107

Parent Item Name: Crosstube Low Standard Fwd

Start Date: 9/15/2010

Required Date: 9/22/2010

Start Qty: 1.00

Required Qty: 1.00

D3595-063-450

Manufactured No

240 Each

131.6590

4 4



ml 10.10.01

RUBBER CUSHION

Location

Loc Qty

Loc Code

LG

131.6589737

53775

5.97897368

58161

3.56

59580

10.12

60983 x 1

33

61465 x 2

79

MS21920-25

Purchased No

240 Each

87.0000

4 4



ml 10.10.01

Clamp(per MIL-DTL-8783C)

Location

Loc Qty

Loc Code

LG

55

113281

0

114759

5

114901

25

115278

25

ST451

32

113281

5

113282

18

113744

1

114141

8

D2893-1

Manufactured No

240 Each

31.0000

2 2



ml 10.10.01

2.75 Support

Location

Loc Qty

Loc Code

LG

31

56354

12

59457

19

Wednesday, September 15, 2010 11:12:00 AM

Shop Packet Print

Page 2

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Picklist Print

Wednesday, September 15, 2010 11:12:00 AM

Page 3

Work Order ID: 62045

Parent Item: D212-664-107

Parent Item Name: Crosstube Low Standard Fwd

Start Date: 9/15/2010

Required Date: 9/22/2010

Start Qty: 1.00

Required Qty: 1.00

D3428-1

Manufactured No

260

Each

2.0000

1

1



Placard

Location

Loc Qty

Loc Code

ST056

2

60484

2

AN6-35A

Purchased

No

260

Each

39.0000

4

4



BOLT

Location

Loc Qty

Loc Code

ST343

39

115204

39

AN6-36A

Purchased

No

260

Each

48.0000

4

4



Bolt

Location

Loc Qty

Loc Code

ST343

48

115016

48

MS21042L6

Purchased

No

260

Each

280.0000

6

6



Nut

Location

Loc Qty

Loc Code

ST300

280

111578

4

114495

76

115300

200

AN960D616

NAS1149D0663J

Purchased

No

260

Each

0.0000

18

18



Washer

Wednesday, September 15, 2010 11:12:00 AM

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Page 3

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

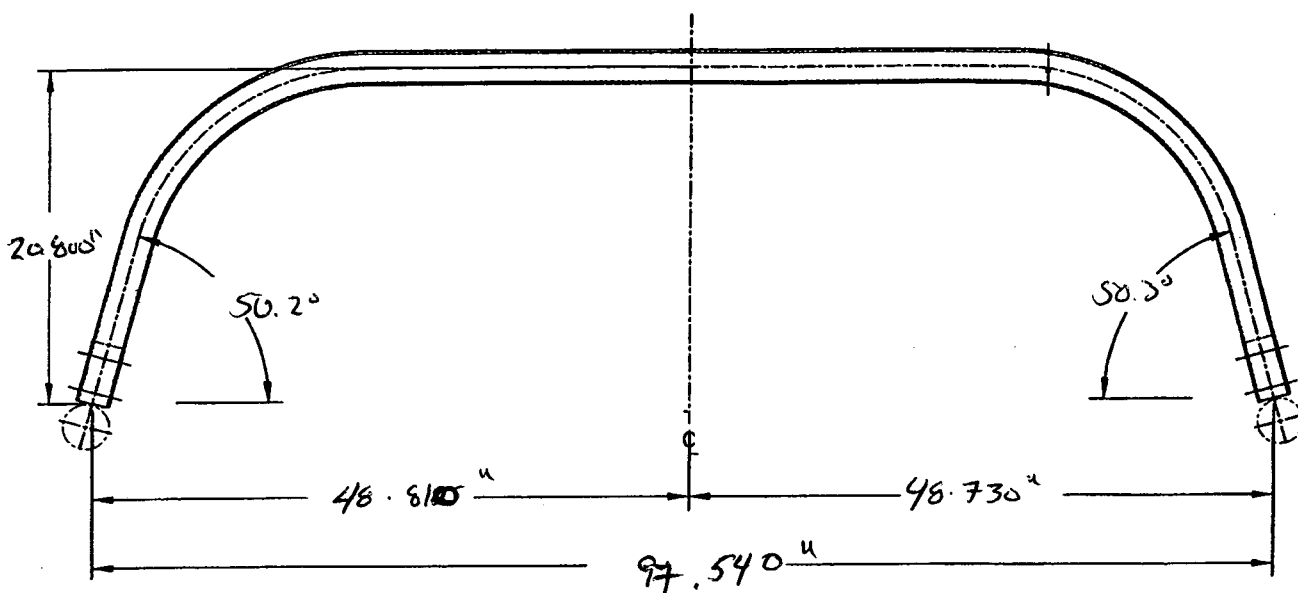
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NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DART AEROSPACE LTD	Work Order: <i>Q2015</i>	
Description: Crosstube Low Fwd (205/212/412)	Part Number: D212-664-107	
Inspection Dwg: D212-664-147 Rev: B		Page 1 of 1

Required Dimension	Min	Max
Height	20.79	21.05
1/2 Span	48.55	48.81
Angle	49	52
Total Span	97.1	97.62



Comments

QC15 Inspection	<i>8</i>
Date	<i>10/01/22</i>

Rev	Date	Change	Revised by	Approved
A	08.02.29	New Issue	KJ/JM	
B	10.01.21	Dwg Rev updated	KJ <i>[Signature]</i>	<i>[Signature]</i>

46.810
46.730
97.540

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

B

Item	Qty -147	Qty -147B	Part Number	Description
1	X		D212-664-147	CROSSTUBE ASSEMBLY (205/212/412 LOW FWD)
2		X	D212-664-147B	CROSSTUBE ASSEMBLY (214 LOW FWD)
3	1	1	D6019-128	CROSSTUBE
4	2	2	D2893-1	SUPPORT
5	4	4	D3595-063-450	RUBBER CUSHION
6	2	2	D3659-1	CUFF
7	4	4	MS21920-25	CLAMP (OR MS21920-26)
8	44	44	CR3212-4-06	RIVET (OR M7885/3-4-06)
9	A/R	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)
10	A/R	A/R	SIKAFLEX-241/-291	SEALANT (OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT)

GENERAL NOTES:

- MATERIAL: MANUFACTURED FROM D6019-128
FINISHED LENGTH = 126.528±0.020 (BEFORE BENDING/TRIMMING)
- FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- UNITS: INCHES UNLESS OTHERWISE NOTED.
- BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- IDENTIFICATION: SCRIBE DART PART NUMBER "D212-664-XXX" AND BATCH NUMBER ON INSIDE OF CUFF
USING VIBRATING STYLUS.
- WEIGHT: D212-664-147 = 24.2 lbs (PER IIN-D212-664)
D212-664-147B = 24.2 lbs (PER IIN-D212-664)
- PART IS SYMMETRIC ABOUT CENTERLINE.
- WHEN MACHINING TAPER, RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD
BE SMOOTH.
- BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6%
BASED ON O.D., EXCEPT UP TO 10% IS ALLOWED IN AREA NOTED.
- LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- INSTALL D2893-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF
D2893-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER
INSTALLATION AND PRIOR TO PACKAGING.
- INSTALL MS21920-25 CLAMPS (OR -26) WITH D3595-063-450 RUBBER CUSHIONS TO SECURE THE D2893-1
SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE SUPPORT.
- EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE
SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS.
DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE
UNACCEPTABLE.
- TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS
NOT BOTTOMED-OUT AFTER TORQUING.
- INSTALL D3659-1 CUFF AFTER CHEMICAL CONVERSION COAT BUT BEFORE PAINT, WITH A LAYER OF
SIKAFLEX-241/-291 OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT BETWEEN CUFF AND CROSSTUBE.
SEAL EDGE OF CUFF TO ENSURE NO GAPS.
- TOUCH-UP HOLES WITH CHEMICAL CONVERSION COAT.

SHOP COPY
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SUBMITTAL COPY
NO. 42045
BF 10-9-15

RELEASED
2009-10-29

B	REVISE GENERAL NOTES/PART LIST; UPDATE TO CURRENT STANDARDS; ADD -147B (ZN C4-2, D4-2)	RF	09.09.30
A	NEW ISSUE	CP	07.07.07
REV.	DESCRIPTION	BY	DATE
DESIGN	RF	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA DRAWING NO. D212-664-147 TITLE CROSSTUBE (205/212/412 LOW FWD) SCALE NTS COPYRIGHT © 2007 BY DART AEROSPACE LTD. <small>THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.</small>	
DRAWN	RF		
CHECKED	RF		
MFG. APPR.	RF		
APPROVED	RF		
DE APPR.	RF		
DATE	09.09.30		

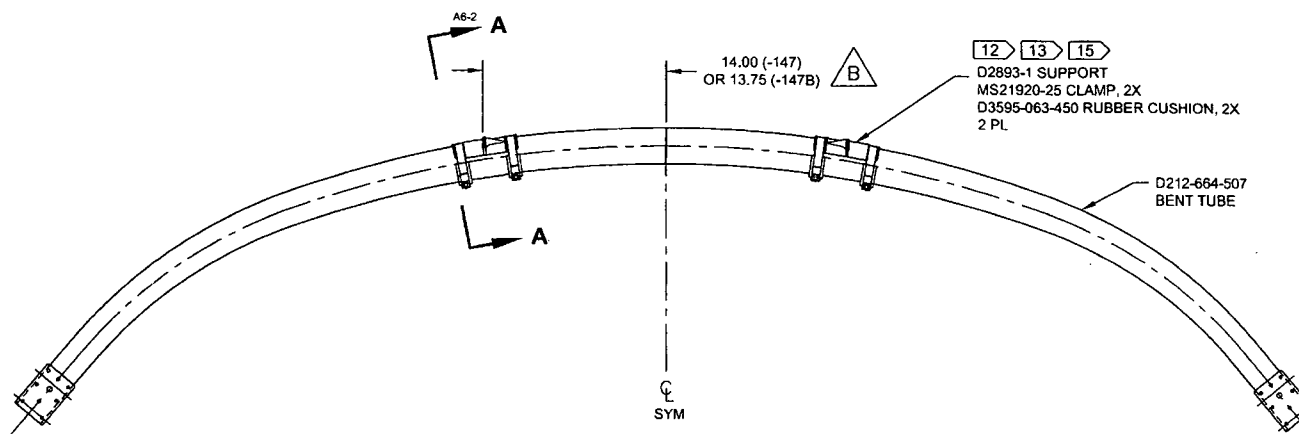
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

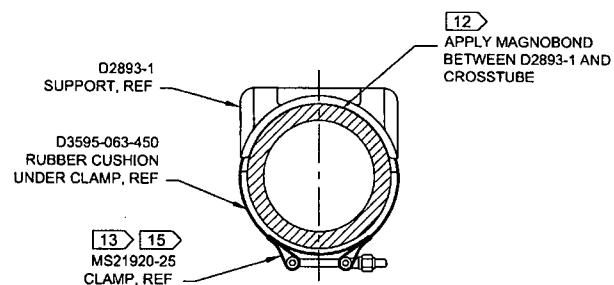
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



D212-664-147/-147B
ASSEMBLY DETAIL



SECTION A-A D5-2
SCALE 4X

w/o 62045

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2009-10-29

DESIGN	90	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	90	DRAWING NO.	REV. B
MFG. APPR.	18	D212-664-147	SHEET 2 OF 4
APPROVED	18	TITLE	SCALE
DE APPR.	18	CROSSTUBE (205/212/412 LOW FWD)	NTS
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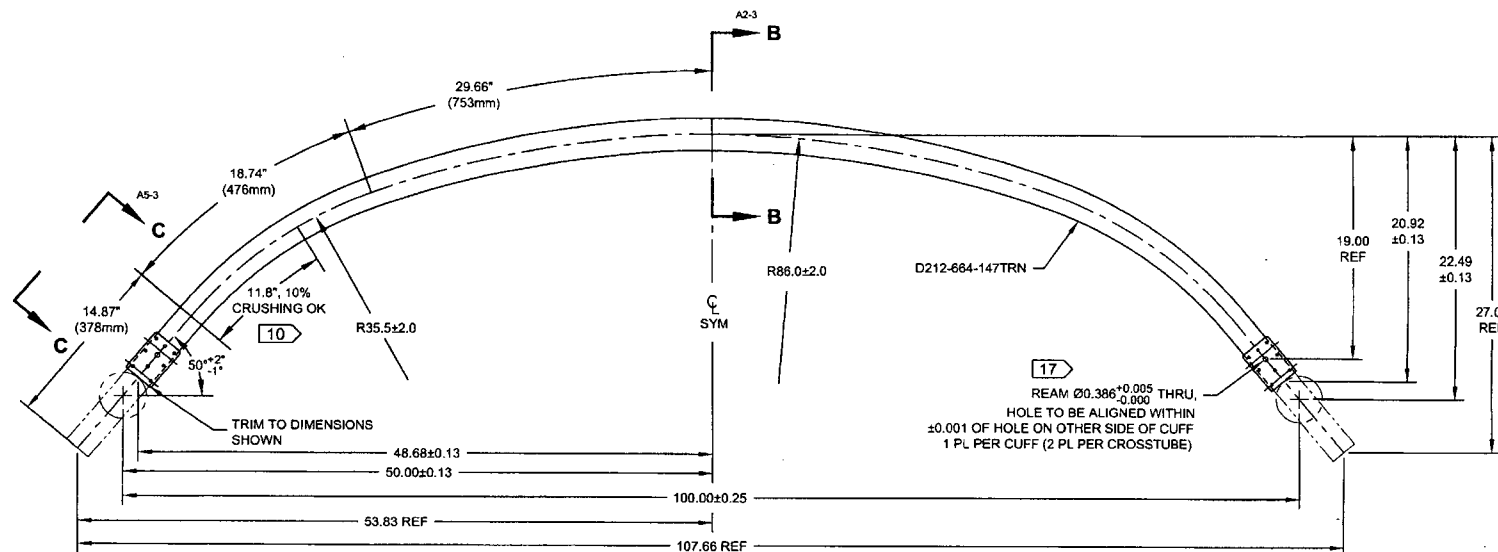
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

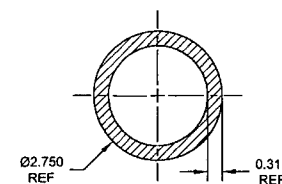
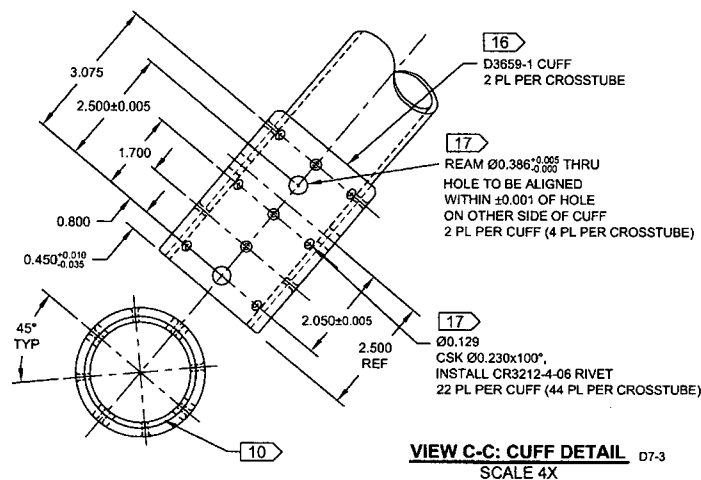
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



D212-664-507
BENDING AND DRILLING DETAIL 10 B



SECTION B-B D5-3
 SCALE 4X

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 2009-10-29

DESIGN	9	DART AEROSPACE LTD	
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CHECKED	9	DRAWING NO.	REV. B
MFG. APPR.	15	D212-664-147	SHEET 3 OF 4
APPROVED	19	TITLE	SCALE
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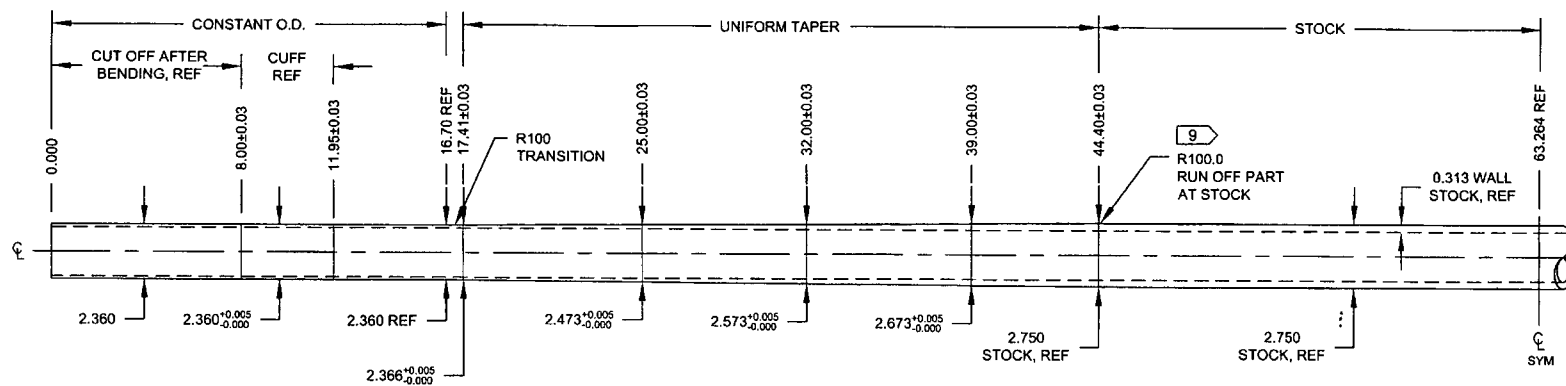
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



D212-664-147TRN
TURNING DETAIL

wlb 62045

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 2009-10-29

DESIGN	92	DART AEROSPACE LTD	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	92	DRAWING NO.	REV. B
MFG. APPR.	92	D212-664-147	SHEET 4 OF 4
APPROVED	92	TITLE	SCALE
DE APPR.	92	CROSSTUBE (205/212/412 LOW FWD)	NTS
DATE	09.09.30	COPYRIGHT © 2007 BY DART AEROSPACE LTD	
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W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

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NOTE: Date & initial all entries



LIQUID PENETRANT TEST REPORT

P- 15194

PAGE 1 OF 1

CLIENT DART AEROSPACE DATE SEPT-28-2010 TIME AM ☒ PM ☐
ATTENTION LINDA/CHANTEL ACUREN JOB NO. 108-10-0895
ADDRESS 1270 ABERDEEN POWO NO. 176531 -
HAWKESBURY ONT. WORK LOCATION HAWKESBURY PLANT
ACCEPTANCE STD. ASTM 1417 REV./DATE 2005
PROJECT F.P.I. on cross TUBES AND MACHINED PARTS.
ITEM(S) EXAMINED (4) CROSS TUBES. (16) - STUDS

JOB DESCRIPTION PROCEDURE NO. LT-0002 REV./DATE - TECHNIQUE NO. LT-TLH2 REV./DATE -
PART NO. - MATERIAL STAINLESS STEEL THICKNESS ALUMINUM
SCOPE WET FLOURESCENT LIQUID PENETRANT INSPECTION
CARRIED OUT ON 100% EXTERNAL SURFACE

TEST DETAILS
METHOD ☒ FLUORESCENT ☐ VISIBLE ☒ WATER WASH ☐ SOLVENT REMOVABLE ☐ POST EMULSIFIED
FAMILY BRAND MAGNA FLUX BLACK LIGHT S/N 16459 ☐ OUTPUT > 1000 μ W/cm² ☐ AMBIENT < 2 fc
PENETRANT ZL 67 MINIMUM DWELL TIME 45 MIN. LIGHTING EQUIP. ☐ FLASHLIGHT ☐ TROUBLELIGHT ☐ OUTPUT > 100 fc @ SURFACE
PENETRANT REMOVER H2O MINIMUM DRY TIME >10 MIN. OTHER LABINO
DEVELOPER SKD 52 MINIMUM DWELL TIME 10 MIN. LIGHT METER S/N 1098866 CAL DUE DATE OCT 19
DEVELOPER TYPE ☒ NON AQUEOUS ☐ AQUEOUS ☐ DRY 2010

TEST SURFACE
SURFACE CONDITION ☐ AS GROUND ☐ AS WELDED ☒ MACHINED ☐ SHOT BLASTED ☒ CLEAN BARE METAL
SURFACE TEMPERATURE ☐ < - 4°C/ 20°F ☐ - 4°C/ 20°F TO 10°C/50°F ☒ 10°C/50°F TO 52°C/125°F ☐ > 52°C/125°F

RESULTS- (☐ METRIC ☐ IMPERIAL)

16 - STUDS - W.O. 61370 ✓
1 - CROSS TUBE - W.O. 62045 ✓
1 - CROSS TUBE - W.O. 61370 ✓
1 - CROSS TUBE - W.O. 61852 ✓
1 - CROSS TUBE - W.O. 61853 ✓

SEE PREVIOUS F.P.I.
REPORT # 15193
IN REGARDS TO
- CROSS TUBES - W.O. 61852
- W.O. 61853...

10-08-29

Scope of Services
The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

Standard of Care
In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES

CLIENT REPRESENTATIVE MATTHEW MURPHY Matthew Murphy DTR # E-63393
TECHNICIAN (SIGNATURE): Mike Johnston REPORT REVIEWED BY:
NAME (PRINT): 1ST TECHNICIAN 2ND TECHNICIAN
CGSB LEVEL 2 SNT LEVEL CGSB REG. NO. 6606 CGSB LEVEL CGSB REG. NO. SNT LEVEL CGSB REG. NO.

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